THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 51. DECEMBER 18, 1948 VOL. 60.

Corynebacterium pyogenes in Bull Semen

By

J. L. HANCOCK and W. R. KELLY

FROM THE WELLCOME VETERINARY RESEARCH STATION, FRANT, SUSSEX

The isolation of *C. pyogenes* from the semen of the bull having been recorded by one of us while engaged on a study of the bacteriology of bull semen in its relation to semen preservation (Kelly, 1947), bacteriological examination for the presence of this organism was adopted as a routine procedure on all samples of bull semen received in the laboratory during the period December, 1945, to March, 1947. The present paper records the results of these examinations.

MATERIALS AND METHODS

The bulls studied were in general submitted for examination by veterinary practitioners because of breeding difficulties encountered in the herds where these animals were maintained. The semen samples were collected by artificial vagina either by the practitioner or by one of us. Where repeated examinations have been recorded on individual bulls, sampling was carried out by the authors. Massage of the ampullae of the vasa deferentia was necessarily employed to recover semen from bull 4 because of the animal's inability to protrude the penis.

Cultivation was carried out by seeding 1 ml. of each of 1:100, 1:1,000 and 1:10,000 dilutions of semen in physiological saline into plates containing 10 ml. melted horse blood agar. After incubation for 48 hours at 37° C. the plates were read and counts made. Pickings were then made into whole meat broth, incubated for a further 48 hours and the cultures tested for purity by microscopical examination of Gram-stained smears. Final identification of the organisms was sought by streaking a loopful of culture on to inspissated serum slopes for evidence of liquefaction.

With this cultural technique, the successful isolation of *C. pyogenes* could only be achieved by preventing contamination of samples at collection. The chief contaminants were spreading organisms of the *Proteus* type which frequently overgrew the cultures. It was found that speed in obtaining the sample was the greatest single factor in controlling contamination. When repeated entry of the penis into the artificial vagina was permitted, the semen was invariably grossly contaminated by infected preputial secretions; contamination was minimal in ejaculates obtained after a single entry of the penis into the artificial vagina and when the semen was deposited directly into the collecting tube. For this reason all bulls were teased before attempting the actual collection and the collecting tube was bent back on the cone immediately after ejaculation to limit the sample to semen ejaculated directly into the collecting tube. Even with these precautions cultures made from samples held overnight at 4° C. were occasionally overgrown to such an extent that identification of *C. pyogenes* was impossible, accordingly all samples were plated when practicable on the day of collection.

Results

Cultural examinations for the presence of *C. pyogenes* were carried out on 150 semen samples from 70 bulls in 40 herds. The organism was isolated from 25 bulls in 16 of the herds studied. The results of repeated examinations carried out at intervals over periods of three to seven months on 12 bulls which yielded positive cultures are shown in Table I. A total of 85 ejaculates was examined from the 25 bulls which yielded at least one positive culture and the organism was recovered from 73.

It will be seen that the organism was recovered from all of 46 ejaculates examined from eight of the bulls and that this persistence of excretion was maintained for periods up to nine months. The numbers of organisms excreted over the observed period, as measured by plate counts, fluctuated widely from sample to sample, but were maintained at a high level throughout the sampling period in several bulls. Two bulls yielded negative cultures after the commencement of the observations, but the subsequent isolation of the organism suggests that excretion in these bulls may have been intermittent. This finding indicates that the examination of more than one sample may be necessary to determine the presence or absence of the organism in the genital tract of the bull. Single samples only, however, were examined from 29 of the 45 bulls recorded as yielding negative samples, and the high rate of recovery of the organism from all samples from known positive bulls (83·5 per cent.) suggests that a single examination will distinguish the majority of carrier bulls.

TABLE I

THE PERSISTENCE OF *C. pyogenes* IN BULL SEMEN

Bull	Samples											Sampling period in months
	1	2	3	4	5	6	7	8	9	10	11	
1C	—	+	+									3
2A	+	180	1,800	79	6	40	100	1,200				3
2B	+	2	40	—	4	—	140	100	20			6
3A	760	2	—	—	19							3
3B	3,500	1,200	300	4,300	4,500	270	300	50	1,100	40	760	7
4	3,300	5,800	2,500	680	60	20	460	13	60	100		3
10	200	7	1									3
14B	+	+	+	+	+							5
22A	8,000	463	+									9
22B	2,000	57	+									9
22C	9	—	+									9
22D	190	1,390	+									9

+ = Positive sample, no count made. — = Negative sample.
Figures in columns 1–11 indicate number of organisms (*C. pyogenes*) in 0·01 ml. semen.

All the animals mentioned in Table I, except bull D, were withdrawn from natural service following the first positive isolation. It follows that reinforcement of the infection which might be assumed to occur during coitus is unnecessary for the maintenance and excretion of large numbers of organisms over long periods. In addition, persistent excretion of the organism was noted in two animals (4 and 14B) neither of which had ever experienced natural service, bull 4 being unable to protrude the penis. In the case of four bulls (10, 22A, 22B and 22C) there appeared to be a distinct fall in the numbers of organisms excreted following withdrawal from service and in herd 22 this fall may be contrasted with the rise in numbers noted in the fourth bull (22D) which was maintained in service by natural mating.

The organism was recovered most readily from samples collected free from preputial contamination and attempts to recover it from sheath washings and sheath swabs from known carrier bulls were invariably unsuccessful. It has been pointed out that it was possible to demonstrate *C. pyogenes* in samples relatively free from contaminating organisms by the collection technique described. This may be evidence that the organism is frequently harboured within the urethra or even higher in the genital tract.

The incidence among bulls in herds identified as containing at least one carrier bull is shown in Table II (overleaf). The ejaculates from 33 bulls were examined and the organism was identified in samples from 20 animals.

A study of the results of examinations of bulls in positive herds shows that in two herds (3 and 22), those bulls which yielded negative cultures were being maintained by artificial service and had not been in sexual contact with the females. In addition, herd 1 consisted of Kerrys and Guernseys and the two positive bulls were Guernseys while the two Kerry bulls examined were free. In herd 2, all of four bulls being maintained in natural service were carriers. The positive bull in herd 13 was a newly imported animal. The findings in herd 15 were the result of single examinations but those in herds 29 and 32 represent examinations of two ejaculates from each bull and in these two herds the potentialities for infection by the venereal route appeared to be equal yet only two of the five bulls were identified as carriers.

TABLE II

THE INCIDENCE OF *C. pyogenes* IN THE SEMEN OF BULLS ON TEN INFECTED FARMS

Herd	Cultural examinations on individual bulls						Total bulls in herd	Total positive
	A	B	C	D	E	F		
1	+	—	+	—			4	2
2	+	+	+	+			4	4
3	+	+	—•	—•			4	2
5	+	+	+				3	3
13	—	+					2	1
14	—	+					2	1
15	+	—	—				3	1
22	+	+	+	+	—†	—†	6	4
29	+	—					2	1
32	—	—	+				3	1
					Total	...	33	20

+ = Carrier bull. — = Non-carrier bull.
• = New bull maintained in artificial service.
† = Young bull never having experienced natural service.

In only one bull (4) was there evidence of invasion of the male genital tract. In this animal it is possible that infection may have followed surgical intervention undertaken to break down preputial adhesions. Smears of centrifuged sheath washings showed numerous epithelial cells and leucocytes investing typical diphtheroid organisms. Two cases of seminal vesiculitis were encountered in the series but cultural examination of the semen of both bulls was negative for *C. pyogenes*. One animal showed an agglutination titre of 1:320 against *Br. abortus* but attempts to recover the organism were fruitless.

Although many of the samples of semen examined were from bulls not available for personal clinical examination, in all cases an attempt was made to assess fertility by examination of all samples for semen density and morphological characters; where practicable, clinical examination of carrier bulls was made and the semen subjected to more complete investigation for the assessment of fertility. The study included several bulls known to be sterile or of reduced fertility but there was no evidence that this reduced fertility was a direct effect of invasion of the male genitalia with *C. pyogenes*. The seminal examinations of several positive bulls indicated that the maintenance and excretion of the organism in large numbers was not inconsistent with excellent semen characteristics. Bulls 3B, 14B, 22A, B, C and 32B, all yielded semen which showed excellent motility and maintained its viability from 14 to 23 days when stored at 4° C. in egg phosphate buffer diluent.

In those herds where *C. pyogenes* was recovered from one or more bulls there was frequently a marked association with genital infection of the females. Herds 1, 2, 3, 9, 10, 13, 22 and 29 all showed a high incidence of infertility associated with pathological changes in the reproductive tracts of the females. The most conspicuous lesions were a purulent cervicitis, pyometra and salpingitis. That these changes were associated with *C. pyogenes* infection was established by cultural examination of vaginal discharges in herds 3, 4, 13, 22, 29 and 32. Attempts to recover the organism from the females were unsuccessful in two herds (1 and 10).

The withdrawal from service of carrier bulls was often associated with a reduction in the incidence of fertility in the herd but there was evidence that service of an animal by a bull excreting large numbers of organisms was not invariably accompanied by clinical evidence of *C. pyogenes* infection in the female. Bulls 2C and 2D were young bulls excreting large numbers of organisms and both animals were running with heifers. Two of the seven heifers run with bull 2C and three of the five run with bull 2D are known to have become pregnant and none of the heifers served ever showed any evidence of a pathological discharge after service. In addition it can be stated that there was no significant difference in the conception rates of positive and negative bulls in three herds for which accurate breeding records were available (1, 13 and 29).

Discussion

It has been shown that *C. pyogenes* may be excreted in large numbers in the semen of clinically healthy bulls and that this excretion may persist for periods of several months. If it can be assumed that *C. pyogenes* is responsible for the pathological changes with which it is so frequently associated in the genital tract of the cow, then it becomes obvious that the infection may be truly venereal in its mode of transmission. It has been shown in the present study, however, that the excretion of the organism in the semen of the bull may occur in the absence of facilities for coital transmission and it has also been pointed out that the mating of a healthy female with a carrier bull is not inevitably followed by evidence of infection in the female. There remains considerable evidence that the use of bulls excreting *C. pyogenes* in the semen in large numbers is frequently associated with pathological changes in the reproductive tracts of the females to which they are mated. It is suggested that bulls known to be excreting the organism should be withheld from service and should not be employed by artificial insemination, as it is probable that the introduction of semen charged with potentially pathogenic organisms into the uteri of healthy females may be fraught with dangers greater than those contingent upon natural service by a carrier bull. The only application for artificial insemination would appear to be to afford the healthy bull some degree of protection from the infected female.

Summary

Cultural examinations for the presence of *C. pyogenes* have been made on 150 semen samples from 70 bulls and the organism has been identified in the semen of 25 bulls.

Evidence is presented to show that *C. pyogenes* may be excreted for considerable periods in the semen of clinically healthy bulls and the significance of the carrier bull as a factor in the transmission of genital disease associated with infection with this organism, is discussed.

Reference.—KELLY, W. R. (1947.) The Family Planning Association. Conference on Infertility. Oxford.

YOUNG FARMERS' ANIMAL HEALTH COMPETITION SPONSORED BY THE N.V.M.A.

The N.V.M.A. is sponsoring one of the national competitions for 1949 organised by the National Federation of Young Farmers' Clubs. The competition is open to all affiliated Young Farmers' Clubs, and consists of an investigation concerning the improvement in health which can be effected by:—

(*a*) Methods of housing or out-of-doors management.
(*b*) Diet.
(*c*) Hygiene on the farm.
(*d*) Preventive inoculations.
(*e*) Removal of internal parasites in calves, pigs, bulls and sheep.

The first prize will be the Bledisloe Cup, presented by Viscount Bledisloe; the second and third prizes will consist of a number of books presented by the N.V.M.A.

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TRYPANOSOMIASIS IN EASTERN AFRICA, 1947

A recently published report by Professor P. A. Buxton entitled *Trypanosomiasis in East Africa* 1947 (H.M.S.O.) is one of a series prepared for the Tsetse Fly and Trypanosomiasis Committee appointed by the Secretary of State for the Colonies in 1944, and edited by the staff of the Bureau of Hygiene and Tropical Diseases. The report is based on tours of West, East and Central Africa, including French and Belgian territories, in 1945 and 1946. Other reports in the series deal with Trypanosomiasis in British West Africa Tsetse Flies in British West Africa, and the Anchau (Nigeria) Rural Development and Settlement scheme.

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RABIES IN AN IMPORTED DOG

The Ministry of Agriculture and Fisheries reports a further case of rabies in an imported dog which was undergoing quarantine at approved kennels in the south of England. The animal, a wire-haired fox terrier bitch, nearly five years old, was landed from India on May 22nd, 1948. On November 18th it had two fits and two days later it showed symptoms indicative of rabies. It was retained at the kennels and was eventually destroyed for humanitarian reasons on November 29th. Microscopic examination at the Ministry's veterinary laboratory confirmed that the animal had suffered from rabies. An unusual, though not unprecedented, feature of this case was the lengthy period of incubation of the disease which could not have been less than seven months.

This is the seventh case of rabies in an imported dog since November, 1946, and affords additional evidence of the value of quarantine.

Some Diseases of Poultry Encountered in Cornwall *

By

R. A. BEAMENT, B.SC., M.R.C.V.S.

Animal Health Division, Ministry of Agriculture and Fisheries

The veterinary work connected with the Accredited Poultry Breeding Stations Scheme, and enquiries carried out under the Fowl Pest Order of 1936, have brought my colleagues and myself into close contact with the poultry industry. We have met many types of farmer, ranging from the breeder running 2,000, or more, birds under a system of enlightened management, to the most backward backyarder, whose methods caused surprise at the possibility of survival of the majority, rather than at the death of the individual. We were brought into contact with many species and breeds and had to conduct *post-mortem* examinations under very varied conditions. Much has been learnt regarding housing, feeding and management. We were surprised at the density of the urban poultry population and gained quite a healthy respect for a creature that was able to live—and in most cases, one has to admit, thrive—under such diverse and often very adverse conditions. This experience has afforded us the opportunity of seeing many common and some uncommon diseases. In this paper I propose to deal with some of our experiences and with certain aspects of diseases which seemed to us to be the most important and interesting.

An endeavour has always been made to get a history of the case—not, I am afraid, always with complete success; indeed, occasions have occurred when I feel we were deliberately deceived. We thus soon realised how important was a thorough inspection of the flock, supplemented, where necessary, by handling a number of affected birds. Such an inspection must be carried out quietly and in a leisurely manner, particular attention being paid to cases of lameness, headshaking, sneezing, wheezing, dilated crop, etc. It is also advisable to inspect the housing quarters including the dropping boards, for here one can gain a good impression of general management and hygiene. Handling poultry is an acquired art, an art which I think well worth acquiring, as nothing gives an owner such a poor impression as a bird awkwardly handled. Having paid due attention to these preliminaries, it is almost invariably imperative to carry out a *post-mortem* examination—if necessary, slaughtering a typically affected bird for this purpose. I have found that many owners have a sentimental regard for their fowls and are not willing to assist in killing a bird. Killing poultry requires knack rather than strength and it is surprising how easily a bird's head may be detached from the body when the operation is carried out by the uninitiated or unskilled.

I do not propose to deal with the whole process of *post-mortem* technique but would like to make a few points. I regard a small *post-mortem* knife and a pair of bowel scissors as the only essential instruments but find a pair of 4½ in. dissecting scissors and a human bone forceps useful adjuncts. I have not found it necessary to nail the bird to a board, but do find it advantageous to damp the feathers, preferably with lysol solution, as soon as an inspection of the carcase has been made for external signs of abnormality. Skinning the abdominal region is preferable to plucking. It is of prime importance that the abdominal wall and breast are carefully removed so that an undisturbed view of the abdominal and thoracic contents can be gained; any carelessness in this direction may result in ruptured eggs or the tearing of an organ, with confusing results. After removal of the breast I usually expose the mouth cavity, oesophagus and trachea by cutting through the maxillary-mandibular joint and running my scissors down the vertebral region to the entrance to the thorax. We have found, if the problem is tackled in a methodical manner, that it has been possible to diagnose in the field at least 90 per cent. of the adult poultry diseases encountered; much more difficulty has, however, been experienced when dealing with diseases of chickens and young stock but it has often been possible to make a correct but tentative diagnosis on history and *post-mortem* examination. The final diagnosis in these cases, however, must depend on laboratory facilities and in this connection I know that the laboratories appreciate fresh specimens and a full history of the case, giving all relative details that may be of assistance to them.

Fowl Pest

Possibly the most spectacular disease encountered has been fowl pest. We have had considerable opportunity to observe it, in the peracute, acute and chronic form, since we were first confronted with a single outbreak in June, 1947, on allotment premises in a seaside town. We were not able to carry out *post-mortem* examinations on any of the fowls lost in these peracute cases, as the owners had effectively disposed of the carcases prior to our becoming aware of the existence of disease. Mortality was very great: in one case 44 birds were lost out of a total of 66 during the first 24 hours; a further ten died during the next 48 hours and the remainder, being then affected, were slaughtered by the owner. It was stated that death occurred very rapidly, the only obvious symptom being malaise. Diagnosis in the peracute cases had to be based on the history and on the haemagglutination inhibition test carried out on bloods obtained from surviving ducks and geese. This haemagglutination inhibition test has proved to be of outstanding value in arriving at a diagnosis in obscure cases. The test depends on the fact that chick erythrocytes are agglutinated by fowl pest virus; this agglutination is, however, inhibited in the presence of serum taken from a bird following infection with the disease, when the serum is said to contain agglutination inhibiting antibodies. Antibodies are generally present by the sixth day after the onset of symptoms.

In the acute form of disease an inspection of the flock showed that the affected birds were very obviously ailing and the following symptoms were observed: sleepy appearance, feathers ruffled, head drawn into the body, eyes half closed, occasional twitching and shaking of the head with muscular tremors, hyperpnoea, with mouth breathing—a pronounced gurgling or rattling being present on inspiration—sneezing, leg and wing weakness, paralysis and distension of the crop; the temperature was elevated and an olive green diarrhoea was almost invariably present. On *post-mortem* examination the birds were usually found to be in good bodily condition. The most constant lesions were pinpoint haemorrhages in the cardiac fat, on the mucosa of the proventriculus, together with enlargement and ulceration of the caecal tonsils; however, haemorrhages were found in individual cases in almost every organ and even in the muscle tissue. We saw ecchymoses on the larynx, in the trachea, omentum, oesophagus, epicardium, throughout the small intestine and in the caecae. In less acute cases it was frequently found that the bowel haemorrhages had progressed to give first, a haemorrhagic ulcer, and later a raised necrotic ulcer, not unlike a swine fever ulcer. The lungs were congested and the crop was frequently found to be lacking tone and distended with gas and fluid.

A diagnosis of fowl pest, based on history, clinical symptoms and macroscopic lesions can be made satisfactorily in the field except in those cases where the disease runs a mild course or has reached the chronic stage in survivors.

The diagnosis of chronic disease is a very different matter; the symptoms may be few and macroscopic lesions obscure or absent. We have encountered cases where survivors have shown no abnormality whatever, where one bird only among 150 has shown a characteristic intermittent torticollis, or where there has been only slight diarrhoea, drowsiness or rhinitis. Egg production has usually been affected. In some cases *post-mortem* examination has been more misleading than helpful although one or more of the following has usually been present: petechiation of the cardiac fat, petechiation of the mucosa of the proventriculus, bile staining of the small intestine or inflammation of the caecal tonsil. Where one is not in a position to give an absolutely conclusive diagnosis, the chronic form of the disease must, I feel, be borne in mind and recourse made to the H.I. test. In this connection, I wish to emphasise that diseases such as tuberculosis, lymphomytoses, etc., are so widespread, that occasional cases are sure to occur concurrently in some outbreaks of fowl pest.

We did not observe clinical disease in guinea fowls, pigeons, turkeys, ducks or geese, although all these species were intimately in contact with diseased fowls. Geese and ducks revealed what was considered to be a positive titre to the H.I. test, the guinea fowls and a pigeon were negative, opportunity did not arise to sample the turkeys.

We have experienced the classical methods of introduction of disease into the county, *i.e.*, access to hotel swill containing unboiled poultry offal, and the purchase of carrier fowls and ducks from known sources of infection. It is interesting to note that all the local spread in a series of more than a dozen outbreaks was without exception due to indirect contact. The necessity of a high standard of personal disinfection when dealing with investigations of this nature is thus emphasised.

Infectious Laryngo-tracheitis

An attempt to deal with the differential diagnosis of fowl pest is beyond the scope of this paper, as we have not encountered many of the diseases involved. We have, however, experienced at least one outbreak of infectious laryngo-tracheitis in which the respiratory symptoms simulated those of pest. The *post-mortem* examina-

* Presented to the Western Counties Division, N.V.M.A., at Plymouth, June 24th, 1948.

tion was carried out for us by the laboratory, which reported typical lesions of I.L.T. in five pullets submitted. The clinical symptoms were those of an acute respiratory affection. The birds, which were first thought to be suffering from colds, were disinclined to move, appeared exhausted, gasped with the beak open and wheezed, shook their heads frequently, sneezed, and coughed up small clots of blood. There appeared to be some swelling of the head. Deaths, which normally occurred within 72 hours of the onset of symptoms, did not exceed 1 per cent.; another 5 per cent. were culled. There was no spread outside the flock and observation of the premises during the last two years has not led us to have any suspicion of the existence of carriers. Exhaustive enquiries failed to reveal an origin for the case but I understand that the low mortality and absence of a known origin are rather characteristic of the disease in this country.

Coryza

Simple cases of coryza are frequently seen. There is often a history of the birds having been moved to new quarters, of growing stock having become overcrowded as they grew, or of some neglect of accepted hygienic principles. The birds appear dejected, show some loss of appetite, sneeze and may wheeze; a thin watery nasal discharge is usually apparent, or can be squeezed from the nostrils by pressure of finger and thumb at the base of the beak. Examination of the underside of the wing will usually reveal a matting of the feathers by nasal discharge. The disease generally runs a benign course, responding to improved ventilation or some such simple adjustment in the management. I have not yet encountered a case of the much more serious infectious coryza or roup.

So-called "Pullet Disease"

In the past we have fairly frequently received laboratory reports giving a diagnosis of visceral gout. Enquiries have invariably shown that the deaths had occurred in single birds and that the rest of the flock was normal. More recently, however, we have investigated scattered cases, with similar lesions, where the mortality and particularly the morbidity has been higher. In one instance the onset was so sudden, while spread and mortality was so great, that one gained the impression that one was confronted by an acute infectious disease. The majority of our findings correspond with the recorded descriptions of so-called "pullet disease." We have met it in the acute and subacute forms, while it is possible that some cases reported to us of reduced egg production, without mortality, were chronic manifestations of the same condition. We have seen this disease in hens, pullets and cockerels of heavy and light breeds, both in autumn and spring. Mortality has not in our experience exceeded 8 per cent., but if the egg yield is taken as a guide the number of birds affected has reached 75 per cent. The affected birds refused food, ceased laying, were listless and the comb and wattles became cyanosed, a weakness of the legs later became apparent and the birds assumed a crouching position from which they were not easily disturbed. A nervous twitching of the head was a feature of one acute case; as the disease became more chronic a very marked distension of the crop was noticeable, while the droppings became very watery to vary in colour from green to pale yellow. The *post-mortem* examination revealed a carcase in very good condition but generally lacking muscular tone. The crop and gizzard were distended and in some cases impacted with coarse grass; there was usually an acute degeneration and congestion of the ovary, loss of tone of the intestinal tract with slight catarrh; a grey urate deposit was present on the serous surfaces of the peritoneum and on the viscera but the most characteristic lesion was a marked nephritis with the deposition of grey urates.

We have not been able to discover how the disease has been introduced into a flock or the method of spread. In one instance it appeared simultaneously in two fields a quarter of a mile apart and spread from fold unit to fold unit, affecting a varying number of birds in the majority of folds but leaving other units apparently untouched. The severe check suffered by young birds just coming into lay together with the serious drop in egg production, often at a vital time for the hatcheries, makes this disease one of great importance and worthy of closer investigation.

Salt Poisoning

It is surprising how many owners ascribe sickness in their stock to poisoning, frequently of a malicious nature. We maintain that poisoning is relatively rare. We did, however, meet a case of salt poisoning, where the owner had obtained about 1 lb. of salt, which he had been given to understand was sugar. This was mixed with oatmeal and flour to provide a day's feeding for seven fowls. The mixture was fed at 8 a.m. and a cockerel died at noon, at 4 p.m. a hen died and the next day a second hen died. The symptoms shown were inappetence, leg weakness, diarrhoea and a most excessive thirst. *Post-mortem* examination revealed gross distension of the crop and diffuse, superficial enteritis. The cock's death was accelerated by inhalation of water apparently from the crop, while one hen ruptured an egg in the peritoneal cavity with consequent acute peritonitis. The remainder recovered. The birds in this case had access to water but in another case where the birds were fed at night with mash mixed with a brine solution and were denied access to water until the morning, the mortality was very much heavier although it is probable that they received a smaller amount of salt.

I have devoted the limited time at my disposal to describing the foregoing diseases in some detail, as I feel they are unusual and thus "news"; fowl pest is in addition potentially dangerous. The average enquiry, however, is much more likely to reveal the cause of death to be something far more commonplace, such as egg peritonitis, neoplasm, tuberculosis, duodenal coccidiosis or even syncope which is a very common cause of death in cockerels but for some reason not commonly associated with females. Egg peritonitis is, I feel sure, the most common cause of death in the individual female; we have a record of 18 cases of this disorder diagnosed in 48 consecutive birds, forwarded for *post-mortem* examination from one premises. The owner is one of the few who make a habit of forwarding all dead birds and culls for diagnosis. The farm is conducted on accepted principles and can, I think, be put forward as quite typical of very many in the county. This high mortality, due to a reproductive disorder, makes one wonder whether the constant demand for eggs is either reasonable or economic, especially when modern thought is tending to put more and more emphasis on increased egg yield. Neoplasms (including visceral lymphomatosis and lymphoid leukaemia) are very common; we diagnosed 17 cases on 75 premises visited during fowl pest enquiries. Although the majority occurred as single cases of lymphomatosis we have records of the latter affecting whole families of birds. While the visceral and ocular types of lymphomatosis are very common we have recently met very few neural cases. I have the impression that the virus has, during recent years, changed its affinity. We encountered very few cases of generalised tuberculosis, which is rather surprising, if the number of bovines that react to avian tuberculin can be taken as a guide to the widespread nature of the disease. Incidentally, it is a mistake to suppose that tuberculosis is a disease only of mature birds as I have seen generalised cases in birds just coming into lay. No year passes without its outbreaks of caecal and duodenal coccidiosis; however, with the advent of sulphamezathine caecal coccidiosis is no longer the problem it was. The duodenal type remains a menace and can cause havoc even in the best conducted flocks. The worst outbreak I have ever seen occurred where the birds were reared on a new "seeds" field, kept free of birds for a number of years; in this case the owner lost about 300 birds just coming into lay. It is a well-known fact that the presence of a few coccidia in the intestines is not, in itself, of any great significance; indeed, there is reason to believe that such a bird may possess a certain degree of immunity. It would seem, however, that this immunity is fairly easily challenged, especially under adverse circumstances, such as poor hygienic conditions, dietetic error, or concurrent disease. We have had a number of cases associated with fowl paralysis where mortality has been high. I believe that cases of duodenal coccidiosis, uncomplicated by any other factor, must be extremely rare.

In conclusion I would urge that more interest be taken in the problems of the poultry industry. I have found that the average poultry farmer is an intelligent and invariably very well read individual worthy of our attention. In the past the poultry farmer has been neglected by the veterinary profession and has consequently been led to rely more and more on unprofessional advice from very many quarters.

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Discussion

Mr. C. V. Watkins, M.R.C.V.S., D.V.S.M., Veterinary Investigation Officer, Starcross, near Exeter, Devon, in opening the discussion on Mr. Beament's paper, congratulated him on the practical way he had dealt with his subject. Perhaps he could not do better than attempt to underline many of the points brought forward by Mr. Beament.

Mr. Watkins proceeded: Poultry offer quite a fascinating field for investigation. The fact that many birds exist in unsuitable environment and still remain unproductive has been mentioned. I would like to say that the amount of disease of one kind or another which can be encompassed by some of these unfortunate birds before they eventually give up their struggle is just as surprising. To illustrate this I will mention a pedigree bronze turkey

stag sent to me for examination. When the abdominal wall was opened we wondered just what we had come to. Continuing cutting through cheesy, caseous material for a further one and a half inches in depth we at last entered the right abdominal air-sac when a cloud of green spores escaped into the laboratory air. This was the most extensive case of aspergillosis I have seen and yet the bird was classed as a champion show specimen very shortly before its death. There was a 100 per cent. mortality in poults on the same premises and due to mouldy litter being used.

Mr. Beament has drawn attention to routine examinations of *post-mortem* specimens. This is very important in my opinion because several diseases may be intercurrent and all must be assessed if losses are to be controlled effectively.

When a start on poultry *post-mortem* examinations was made in 1930, I came across many chick losses in which signs of chill were the only features of the *post-mortem* picture. Further work failed to show a bacterial, parasitic or dietetic cause although a few revealed what was probably a terminal *B. coli* invasion. Having noted lesions of brooder pneumonia of young chicks were often so slight as to be fairly easily missed, a series of cultural tests for mycoid pneumonia was made. It proved well worth while, as quite 10 per cent. of cases previously labelled chill yielded good growths of thermophilic *Aspergillus sp.* of moulds.

As control of the two conditions is different we have since included this cultural test of all young poultry whenever a congested condition of the lungs has been found. For adequate control, food, litter and storage bins besides the poultry house must be suspect. Thorough cleansing and disinfection, preferably with hot soda solution, is necessary. Correct ventilation and the avoidance of dampness and not forgetting possible "carriers" among survivors in the group are the other essentials.

I think one could become adept at these examinations without nailing specimens to a board. Having used the latter method from the start I am sure I would be awkward otherwise. I do not like wearing rubber gloves. I prefer clean hands and instruments with a brush and bowl of disinfecting solution handy. To get away from feathers I skin by means of a median cut (bird pinned back on board) reflecting the skin from breast back to wing joints and from abdomen to the stifle joints.

I agree as to inadvisability of forming an opinion as to the cause of chick losses and mention, as one example, how impossible it is to distinguish the many types of salmonella infection. I have already said something similar *re* brooder pneumonia. Many cases may be quite atypical from their text-book descriptions.

For these reasons I tend to treat my visual impressions in adult poultry specimens with a degree of reservation until what I think may be present has been proved to be so or otherwise by further microscopical, cultural, chemical or other tests. For example, granulomatous lesions set up by B.W.D., listeria infection and tuberculosis can approximate each other so closely as readily to lead to mistakes in diagnosis. Another form of disease in adult stock which often proves difficult to spot in the odd specimen is the chronic form of duodenal coccidiosis at certain stages. There may be an absence of oöcysts in wet preparations examined and a few macrogametocytes alone may be present in scrapings of the bowel membrane, but even these are not constant. It is generally quicker to ask for further specimens than to resort to examination of sections.

I can leave fowl pest, which has been very well outlined in all its most important aspects, except for mention of haemorrhagic lesions in the cloaca in a few cases sent in error to my laboratory. This may be important as a possible inducement to cannibalism which could for a time prove too easily a diagnosable cause of death. One other point. In my limited experience swill has been emphasised as a source of infection. For instance, pig swill was collected on one premises. When the poultry food gave out the offal for pigs was fed, with the consequent outbreak of fowl pest of which I got a specimen.

I am not at all sure if what has been described as pullet disease by Mr. Beament is not in fact visceral gout. I do not know that urate deposits on the serous surfaces and viscera other than the kidneys have been described in pullet disease. The only other organ in which chalk-like deposits may be found is the pancreas, I believe. Petechial haemorrhages have been mentioned, *e.g.*, on the serous surfaces of the abdominal fat, inside the sternum and in the pericardium. A degenerate ovary may be another feature.

I would suggest a careful check on the protein and its proportion in the food being used and also on ventilation, because cold draughts often complicate or accentuate a gouty condition.

The next matter Mr. Beament raises is the extent of poultry losses ascribed by owners to poisons of various kinds. Occasionally in my experience careless handling of rat baits and prebaits has been the cause of serious loss. In one instance poison baits were placed first in error and killed off 40 laying hens because all thought prebaits had been used.

In the last few days a friend of the owner of two ducks saw them ailing one day and dead in their house the next morning. Apart from very slight congestion of the lungs and intestinal mucosa and a flush over the yolk-sac membranes nothing abnormal was found culturally or otherwise. On testing for poisons, however, we obtained a trace reaction for phosphine which probably indicated death from zinc phosphide rat baits.

I cannot agree that deaths from poisoning are rare. This is understandable when one considers the extensive amount of vermin baiting now being done by various authorities.

Concerning tuberculosis, my returns for adult stock in Cornwall show a high proportion in our findings. I think it should be absent in accredited flocks and eliminated by repeated tests whenever found. Also in pedigree flocks in which line breeding may be practised, it is one of the chronic diseases to be on the look out for in the older birds kept on for this purpose and likewise stamped out when detected.

If poultry stock on general farms is to be increased a necessary first precaution is to check for such chronic insidious diseases as tuberculosis. Losses in every stage of growth may result once such a disease becomes established.

I am very interested in the remarks about fowl paralysis and duodenal coccidiosis. Mr. Beament has mentioned an orientation of lesions away from the neurotropic cases to a larger proportion of lymphomatous forms.

Recently, in one of my reports, I remarked that I was encountering more early cases of neurolymphomatosis in young birds about ten weeks old in which very well-defined nerve lesions were present.

I must also disagree about duodenal coccidiosis not being itself a lethal factor. I have encountered it as a chronic form alone in adult fowls in which the bowel wall was thickened about three times that of normal and on the other hand, have seen the disease so acute in type that a very obvious dysentery was present. All types between these extremes may be found but both mentioned are lethal.

Out of a total of 80 reports sent during the last few months, poultry specimens from Cornwall amounted to 4 per cent. and the variety of findings was briefly mentioned.

Finally, I would like to stress, as a great help towards a useful finding and possible advice for the remaining flock, that full particulars be sent at the same time as the specimens. They often lead to a quicker diagnosis in spite of the examinations being made in a routine way.

Mr. Watkins adds the following comments on points raised in the general discussion:

Poisoning of turkeys when treated by arsenicals: In general, dosage must be carefully regulated according to the makers' instructions. If intravenous medication is used the slowness of the injection is all important; if it is hurried a fatal result from coagulation of the blood is to be expected.

Re fowl paralysis and treatment, mention was made of Dr. Asplin's results with sulphamezathine: As coccidiosis, among parasitic diseases which in general complicate the disease, is the most common, some results of treatment by this drug may be due to control of coccidiosis. In my opinion, apart from culling of infected strains from breeding stock, the best measure of control against development of symptoms of fowl paralysis appears to be prompt diagnosis and treatment of all complicating factors such as faulty feeding and parasitic diseases.

As to whether fowl paralysis or coccidiosis comes first: Both can be primary disease, the former transmitted through the egg and the latter contracted within the first days from hatching. Some enteritis is generally a feature of fowl paralysis, from which it is to be expected that resistance to internal parasites may be lowered.

Re egg peritonitis: This is the commonest cause of loss among laying stock. My advice has usually been to reduce forcing feeding and to check on the way birds in lay are handled: trap nest recording may increase losses considerably from unduly rough handling. Also, perches and nest boxes should be made readily accessible and devoid of all sharp edges and projections so that self injury by birds using them is reduced to a minimum.

Weekly Wisdom

As to the learning of scientific method, the whole thing is palpably a farce. Actually, for the convenience of teachers and the requirements of the examination system, it is necessary that the pupils not only do not learn scientific method but learn precisely the reverse, that is, to believe on the authority of their masters or text-books exactly what they are told and to reproduce it when asked, whether it seems nonsense to them or not.—J. D. Bernal, F.R.S., "The Social Function of Science."

CLINICAL COMMUNICATION

A Fresh Approach to the Repair of the Os Calcis in the Greyhound *

J. K. BATEMAN, B.SC. (EDIN.), M.R.C.V.S.

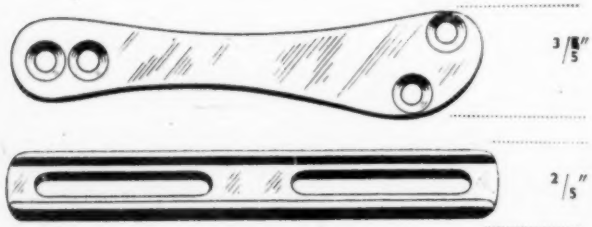
NORTHAW, POTTERS BAR, MIDDX.

Fracture of the Os Calcis in the racing greyhound is of not infrequent occurrence. It takes place in the off hock as a rule and is almost invariably secondary to fracture or dislocation of the scaphoid bone. When the scaphoid bone jumps forward out of place its absence from the front of the hock structure permits a slight flexion of the multiple joint. If strain is put on the extensor muscles at that moment, the Os Calcis is snapped through over the fulcrum of the combined tibia-tarsal joint.

As a rule the fracture is simple and consists generally of a slightly larger upper part and the smaller, narrower lower part. Various attempts have been made by others and myself to effect a satisfactory repair. The fractured ends are approximated by means of silver wire threaded through holes drilled in the fragments, and extension or other splints are applied, but the many cases I have seen have not produced the result that we, as veterinary surgeons, can be proud of.

The stumbling block to satisfactory recovery is the continual strain applied to the proximal fragment by the tension of the gastrocnemus muscle. This bends that fragment over the tarsus until its anterior surface lies close to the posterior surface of the tibia. The result, in recovery, is that the angle made by the foot on the ground is more obtuse anteriorly, the multiple hock joint is closer to the ground than normal and the posterior aspect of the healed fracture is rounded.

The method I have adopted, and which, though by no means perfect yet, I commend to those who are interested, is to wire the broken fragments as before and then, having approximated the edges, to insert a stainless steel plate, or a plate of other material, screw it to the upper fragment of the Os Calcis posteriorly and laterally, and to the lateral surface of the tibia anteriorly.



The operation is best performed on the fourth day after fracture. It limits the forward pull of the upper fractured fragment and resists the strain of the muscle on it.

An "L"-shaped splint is applied to the medial surface of the leg when bandaging, and plate and wire are removed between the fourth and fifth week.

Though the ultimate object of the operation is to get such a case to race again, my primary concern was to perform—and to get others to do similarly—such an operation that the repaired hock is one which would not cause a blush of embarrassment at the result. No dog of the three so far done by me has yet raced and, since I am adverse to the racing of semi-cripples, will not do so in London, but I confidently believe that some so treated in the future will yet race again.

I am much indebted to Major Hopkin, of Knutsford, who found me the plates, and to Major Going and Mr. Ian Mackinnon, my enthusiastic colleagues, who did the X-ray work and who so patiently bore with me whilst I worked and who dressed the legs so well afterwards.

Attention is drawn to the following points:

(*a*) The small saphenous vein must be avoided.

(*b*) The popliteal tendon will be interfered with and may be ignored or split longitudinally to allow of screwing, the plate being then inserted between it and the tibia.

(*c*) In subsequent dressing there is a tendency for the Os Calcis to turn slightly medially.

(*d*) Ultimate success depends partly on the extent of damage to the Plantar Ligament.

(*e*) A fibrous sheath will form in the path of the inserted plate.

* Presented to the "Clinical Meeting" of the Central Veterinary Society, held at the Royal Veterinary College, October 7th, 1948.

ABSTRACTS

[Use of Intramedullary Pins in Small-animal Fractures. BRINKER, W. O. (1948.) *N. Amer. Vet.* **29.** 292-297.]

Brinker discusses the use of intramedullary pins to effect repair in fractures of the femur and tibia in cats and dogs.

Following anaesthetisation the fracture is reduced by use of the Gordon extensor or by open reduction if this method is considered necessary to obtain end-to-end apposition—the latter procedure being preferred to subjecting the patient to undue X-ray exposure during fluoroscopy for this purpose. Steinmann pins from two to nine inches long, varying in diameter from 1/6 to 5/32 inch, are then inserted into the medullary cavity by a combination of pressure and rotation of the pin handle. In femoral fractures in the dog, the great trochanter is located and the pin thrust through the skin and underlying tissue along the medial surface of the trochanter, thus into the trochanteric fossa and through the bone shaft into the marrow cavity. In the cat the point of insertion is medial but $\frac{1}{4}$ inch posterior in relation to the great trochanter. With tibial fractures the stifle is first flexed and the pin inserted through the skin along the medial border of the straight patellar ligament and parallel with the long axis of the bone. In most cases the proximal end of the pin is left exposed. The pins are removed at periods varying from two to three weeks.

The author states that functional recovery is excellent and this he associates with the fact that as no additional support is employed: muscle tone is responsible for adjusting the alignment of the limb.

Twelve case reports are given and two pictures and ten radiographs illustrate the article.

C. W. O.

* * * * *

[A Newly Developed Anaesthetic for Large Animals. MALLENBRUCK, E. W. (1948.) *J. Amer. vet. med. Ass.* **112.** 345-347.]

An endeavour to find a suitable anaesthetic for large animals led to the combination of three drugs of known individual action: nembutal, a motor depressant; chloral hydrate, a sensory depressant, and magnesium sulphate to reduce the period of excitement. The drugs were compounded in the following proportions: 100 gr. nembutal, 1 oz. chloral hydrate, $\frac{1}{2}$ oz. $MgSO_4$ in 1,000 c.c. water. A precipitate, which appeared if the mixture were allowed to stand for a few hours, was eliminated by the substitution of pentobarbital acid for sodium pentobarbital and the addition of propylene glycol and alcohol. This mixture is marketed by the Jen-Sal Laboratories under the name of "equi thesin."

Administration is by the intravenous route—slowly to begin with until the animal begins to stagger, the rate being then increased until the animal is ready to fall, at which stage the needle is removed. This procedure should produce surgical anaesthesia for 30 minutes; if longer is required, efforts should be made to keep the animal standing for a longer period so that more of the solution can be administered. The average dose for horses is given as 67 grains pentobarbital, 20 grammes chloral and 10 grammes $MgSO_4$ per 1,090 lb. body weight. The period of recovery is rapid and uneventful, toxicity is negligible. The author records its successful use in approximately 250 cases, including cattle, pigs and dogs.

C. W. O.

Herefordshire Weights and Measures Committee reported to the County Council that their inspectors had received a number of requests to sample and examine hop-drying fuels for the presence of arsenious oxide. Growers were becoming increasingly concerned with the problem of possible arsenical contamination.

* * * * *

British Horse Society.—The British Horse Society's three-day event competition at Badminton, will be held on Wednesday, Thursday and Friday, April 20th, 21st, 22nd, 1949.

FIG. I.—Simple fracture Os Calcis.

FIG. II.—Repair of fracture, as shown in Fig. I, by stainless steel splint.

FIG. III.—Repaired fracture Os Calcis by vitallium splint.

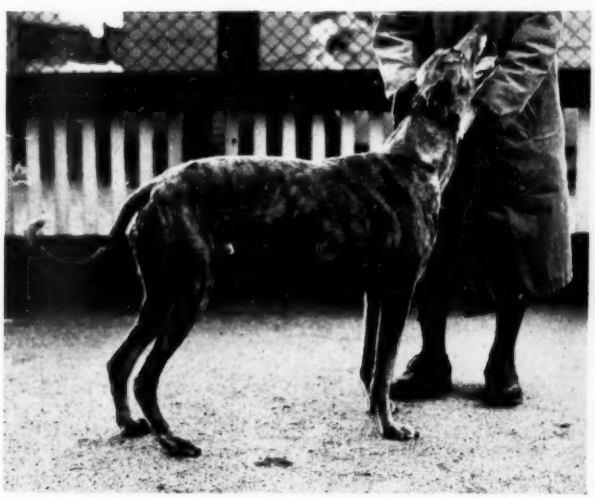


FIG. IV.—The Repaired Hock of Greyhound (Fig. No. III) three months after operation.

Questions and Answers

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

The Effect on Herd Health of Change of Topographical Environment

Q. CCLXXIV.—*It is proposed to purchase an attested pedigree Guernsey herd which has been kept on a chalk subsoil at about 400 ft. above sea level—and has laid out day and night, winter and summer. The herd would be moved into a reasonably well drained farm with a clay subsoil at about 40 ft. above sea level. The animals would lay out except at night in winter, when they would be housed in covered yards. Is there likely to be any interference with or setback in the health of the herd, either adult or young stock, as a result of this change?*

A.—It is unlikely that a change of this character would be without considerable effect, at least temporarily, upon milk yield and perhaps upon other factors connected with health status, *e.g.*, fertility, parasitism and even milk composition. It is impossible to give any more detailed prediction in the absence of information upon the records and nutritional status of the animals concerned and upon the comparative rainfall and other climatic factors, available food supplies (including pasture), rate of stocking, variations in management, and parasitic infestation.

These cases in which a whole herd is moved from one environment to another could provide excellent material for a study of the relationship of environmental factors to health and productivity. Subject to the co-operation of the owner, it would be a most useful study if the nutritional, parasitological and productive status before and after transfer could be compared and could be related to climate, soil and available food supplies.

* * * * *

Treatment of Wens

Q. CCLXXV.—*I have heard that there is some injection used in the treatment of wens. I refer to the tumours caused by the actino-bacillus. Is this an injection into the wen, and if so, what is used and at what stage in the development of the wen? I have found that potassium or sodium iodide is specific for similar infections of tongue and palate, but have not found either of any service in the treatment of wens.*

A.—The condition referred to in the question is probably that known in other localities as "lumpy jaw" and is a true actinomycosis of the bony structures of the head, which differs from actinobacillosis of the soft tissues in that it is extremely resistant to treatment.

Once the condition is well advanced no known treatment is likely to prove satisfactory, in that considerable tissue changes have already occurred in the bones of the head, and secondary invaders have become well established. On the other hand, if taken in the early stages, relatively heavy doses of sodium iodide (up to 1½ oz.) given intravenously at intervals of seven to ten days may effect a complete cure, even though some slight bony abnormality remains as a permanent blemish. More advanced cases can often be kept in check by the same means in order that the animal may be marketed economically.

Potassium iodide given by the mouth either alone or in conjunction with small doses of biniodide of mercury, has a very similar action to sodium iodide but is very much more toxic to the patient, and its administration very much more tedious to both itself and its attendants. Injections of iodine locally into the lesion have also been advised. Occasionally lesions are such that surgical treatment combined with iodide therapy is practicable. The sulphonamide drugs appear to have no effect upon true actinomycosis.

Penicillin is specific against actinomycosis, but when given by the intramuscular or intravenous routes such massive and prolonged dosage is required as to render the treatment uneconomic in the majority of cases.

Where it has been possible to commence treatment before the bone has become too hard, improvement has been recorded following the injection of 100,000 units aqueous solution of the Na salt at three or four sites, directly into the lesion.

Aural Resection in the Dog

Q. CCLXXVI—*Can you suggest the indications for and describe the operation of aural resection in the dog?*

A.—The indications for aural resection in the dog are:—

(1) Ulcerative otitis in which the ulcerated opposing surfaces are in contact.

(2) Purulent otitis. This is really an extension and more severe form of (1).

(3) Cases in which the opening of the external ear is filled with warty growths. In these animals the operation of aural resection is carried out and the warty growths are then removed with knife or scissors and the surface seared with the actual cautery. This gives much better results than simple excision.

The following is a brief description of the operation of aural resection:—

General anaesthesia is essential and nembutal is the most convenient. The anaesthetised animal is laid on the table with the affected ear uppermost; the hair is clipped or shaved from an area about three inches wide, immediately adjacent to the opening of the external ear, and the site is prepared in the usual way. An assistant now holds the point of the ear so that the flap is parallel with the table and a grooved director is inserted into the opening and gently pushed as low as possible. An incision is made in the outer wall of the external ear, going in turn through external skin, cartilage and the skin lining the opening. It is essential that the incision should be made to the lowest point of the groove director. A fine nylon suture is now inserted in the top of the anterior portion of the wound, uniting external skin to lining skin, and a similar suture is inserted at the top of the posterior portion of the wound. These sutures are left long and clipped with artery forceps which are held by the assistant. This opens the wound like a letter "V" and facilitates the completion of suturing. Sutures are now inserted the whole length of the wound, uniting lining skin to external skin over the cut surface of the cartilage. Some surgeons prefer to remove a narrow strip of cartilage on either side. The ear is strapped back on top of the head by adhesive strapping and it is usual to bandage the ear for the first 24 to 48 hours, after which it is better unbandaged. Sutures are removed at the seventh day. A water-soluble ointment base prevents sticking of the bandage and appears to make the wound more comfortable for the patient if applied daily.

THE ANIMAL HEALTH TRUST

Evans Fourth Year Studentships

The Animal Health Trust announces that the Evans Fourth Year Studentships for 1948-49 have been awarded as follows:—

Royal Veterinary College: Mr. R. G. Walker, 5, Clevemede, Goring-on-Thames, Oxon.

Royal (Dick) Veterinary College, Edinburgh: Mr. George Edgar Hayes, Coppice Howe, Burneside, nr. Kendal, Westmorland.

Veterinary School, University of Liverpool: Miss Annie Littlejohn, 22, Arbirlot Road, Arbroath, Angus.

The Glasgow Veterinary College: Mr. Bernard Finkelstein, c/o 263, Maxwell Road, Glasgow, S.1.

Veterinary College of Ireland: Mr. Francis Mahon, Blackwell Lodge, Bennettsbridge, County Kilkenny, Eire.

* * * * *

Trivia

On his first day as *locum tenens*, the new graduate, serene in crisp white coat, stood awaiting his first patient during the surgery hour. Would it be an elkhound with Hodgkin's disease or a mongrel puppy with a greenstick fracture? A cat with a ranula or some obscure skin disease? Exuding confidence, he pondered these possibilities and reflected upon some of the very latest diseases and treatments current at the —— Veterinary College.

Confidence was short-lived. The receptionist ushered in two very small children, one of them clasping a large glass bowl. A disconcerted *locum* stared doubtfully at his patient, a baleful-looking goldfish.

"What is the trouble?" he asked brightly, and looked at the fish in a more broad-minded way. After all, no use getting panicky. The children probably only wanted a few words of advice. Common-sense, palliative treatment, just a matter of giving the client confidence—these and other platitudes crossed his mind.

"We want to know," said the smaller child with the utmost gravity, "whether it's a lady or a gentleman."

And to this day that *ex-locum* wonders which it was.

ROYAL COLLEGE OF VETERINARY SURGEONS

Membership Examinations, December, 1948

LIST OF SUCCESSFUL CANDIDATES

London

FIRST EXAMINATION

Both Subjects

Ferguson, E. C.
Gemmell, M. A. (C)
Jones, M. D. Berwyn
Michael, J. R. (C)
Owen, J. H.
Rodgers, M. J. (C)

One Subject

Bovett, P. W. (C)
Humphreys, M. J. (B)
Kirkwood, A. D. J.
Lloyd, E. R. O.
Stephens, J. M.

(C) denotes credit in Chemistry.
(B) denotes credit in Biology.

SECOND EXAMINATION

Both Subjects

Christie, E. J.
Chandler, H. M.
Hoddinott, R.
Morgan, T. O.
Newbery, M. J. E.
Poland, J. R.

One Subject

Barker, G. L.
Blyth, A. M.
Catterall, P. W.
Claydon, R. K. (P)
Davies, W. E. O.
Davy, Miss J. D.
Downie, N. F. (P)
Edwards, T. W.
Evans, A. D. G.
Grimsell, D. M.
Jones, A. P.
McMillan, D. D.
Marston, J. R. T.
Neal, N. W.
Sambell, R. A. J.
Sparrow, W. B.
Traynor, D. K.
White, Miss K. S.
Williams, W. D.

(P) denotes credit in Physiology.

THIRD EXAMINATION (*Revised Syllabus*)

One Subject

Bateson, W. B.
Beaumont, J. E.
Beckett, R. L.
Blampied, N. le Q.
Bradley, G. E.
Burman, P. (H)
Corder, J.
Cox, Gordon
Croft, Miss P. G. (H)
Davies, D. C.
Davies, J. I.
de Gruchy, P. H.
Evans, G. A. J. Culver
Fumpston, W. A.
Garland, J. E.
Gibson, Miss M. A.
Goodwin, R. F. W. (H)
Griffith, K. P.
Hall, I. W.
Hannaford, P. J. (H)
Harley, P. J. (H)
Harthoorn, A. M.
Heath, J. S.
Howard, R. W.
Ikin, Peter (H)
Jack, E. J.
Jackson, B. N.
Johnson, Miss A. I.
Jones, D. G. H.
Jones, I. I. (H)
Jones, J. E. T.
Kirkby, W. W.
Mercer, P. H.
Paine, G. D.
Simpson-White, J. N.
Smalley, P. R.
Smith, A. C.
Threlkeld, J. M.
Wadsworth, Frank
Wheeler, Miss E. C.
Williams, B. M.

(H) denotes credit in Hygiene

FOURTH EXAMINATION

Batt, P. R.
Beresford-Jones, W. P.
Bishop, H. W.
Bowen, D. L.
Butler, G. A. F.
Clifford, H. R.
Craven, J. R. E.
Davey, T. E. L.
Fox, R. C.
Gilbert, G. A.
Hardy, R.
Hickman, S. J. H.
Hughes, Miss R.
Mack, R. M.
Oliver, A. C.
Pengelly, J.
Richardson, J.
Roberts, L. W.
Robinson, C. E.
Sasibutra, L.
Simmonds, D. J.
Smith, F. R.
Spittle, R. J. H.
Stanilas, I.
Stratton, John
Sutherland, Miss A. M. B.
Toop, B. R. V.
Whitney, J. C.
Widrich, Miss S.
Williams, K. R.
Wooton, J. C.
Yeats, J. J.

FINAL EXAMINATION

Ashton, M. A.
Beale, R. K.
Berry, M. H.
Boughton, A. R.
Bowler, G. T.
Callear, J. F. F.
Darbyshire, J. H.
David, V.
Dickinson, G. (S)
Gharib, H. M.
Howorth, J.
Hughes, E. J.
Hurst, P. E.
James, Miss V. M.
Jones, W. A.
Mayes, S. E. V.
Mulcair, T. B.
Ogden, A. L.
Orton, R. G.
Packer, D. O.
Pinnigar, R. S. (M)
Price, E. K.
Rackham, Miss J. A.
Redfearn, M. S.
Scott-White, Miss A.
Smith, R. N.
Stone, Paul
Throssell, P. J.
Walsby, J. B.

(M) denotes credit in Medicine.
(S) denotes credit in Surgery.

Dublin

FIRST EXAMINATION

Both Subjects

McDermott, Patrick

One Subject

Dowdall, F. J.
Gallagher, E.
Scott, W. A.

SECOND EXAMINATION

Both Subjects

Casey, P. J. P.
Magee, P. J. H.
Nelson, W. F.
O'Connor, Michael
O'Connor, P. J.
Scully, M. A.
Sheehan, D. P.
Tyrrell, K. M.

One Subject

Blake, J. W. F.
Carroll, J. A.
Davies, S. F. M. (A)
Fitzpatrick, E. P. (A)
Forde, D. M.
Keatinge, J. P. (A)
Knightly, J. C.
Lyons, P. J.
McClintock, S. J.
McGarry, W. V.
Mehigan, C.
O'Driscoll, J. G. (A)
O'Rourke, W. J.
Purcell, P. (A)
Roddy, R. M.
Rogers, E. P. S.
Ruane, E. J.
Schorman, N. S.

(A) denotes credit in Anatomy.

(*To be continued*)

NOTES AND NEWS

Diary of Events

Dec. 22nd.—Meeting of Lancashire Veterinary Association at Manchester (The Midland Hotel), 2.30 p.m.

Jan. 5th, 6th and 7th, 1949.—Quarterly Meetings of Council and Committees, N.V.M.A., in London.

Jan. 5th.—Meeting of the Southern Counties Division, N.V.M.A., at Salisbury (Red Lion Hotel), 2.30 p.m.

Jan. 7th.—General Meeting of Association of Veterinary Teachers and Research Workers (Southern Region), at Royal Veterinary College, N.W.1, 11.30 a.m.

Jan. 10th to 13th, 1949.—R.C.V.S. Council and Committees, 10, Red Lion Square, London, W.C.1.

Jan. 21st.—157th Annual Ball of R.V.C., at Grosvenor House.

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N.V.M.A. Meetings in London

In order that they may have the opportunity of reserving accommodation, the atention of those concerned is drawn to the fact that the next Quarterly Meetings of the Council and Committees of the Association will be held in London on January 5th, 6th and 7th, 1949.

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Inauguration of the School of Veterinary Science in the University of Bristol

In 1943 the Committee on Veterinary Education, of which Dr. Thomas Loveday was Chairman, recommended that a new school of veterinary science should be established in the University of Bristol, and with the concurrence of the Ministry of Agriculture and of the University Grants Committee the University undertook to carry out the recommendation. In our issue of August 28th

we announced the appointment of Mr. F. Blakemore as the new school's first Professor of Veterinary Medicine, and on Friday last—December 10th, 1948—the plans were carried a momentous stage further by the official inauguration of the school by the Minister of Agriculture and Fisheries, the Right Hon. Tom Williams, M.P.

The proceedings, which were of a most impressive character, commenced at 11.30 a.m. with a Procession of University staff. The Vice-Chancellor, Sir Philip Morris, then invited Professor Blakemore to outline the aims of the school, following which he introduced the Minister, who addressed the meeting. The thanks of the gathering were expressed to Mr. Williams by Sir Robert Sinclair (Vice-Chancellor and Chairman of Council) and by Professor Skene, who asked Dr. Loveday to lay the Foundation Stone. Following Dr. Loveday's address the company adjourned in procession to the building site, where the stone was laid, and the architects and others presented to Dr. Loveday.

The inauguration ceremony was followed by a luncheon, when further refereńce was made to the function of the school in the development of veterinary education and as establishing a new contact between the University and the great industry of agriculture. A large number of veterinary practitioners from the South-West attended as guests, in addition to Dr. R. F. Montgomerie, President, N.V.M.A., Mr. H. W. Dawes, President, R.C.V.S., and Mr. W. G. R. Oates, Secretary and Registrar, R.C.V.S., Professor Thos. Dalling, Chief Veterinary Officer, Ministry of Agriculture and Fisheries, and Dr. W. R. Wooldridge, Scientific Director of the Animal Health Trust.

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PERSONAL

Forthcoming Marriage.—Brook—Biggers.—The engagement is announced between Alan B. Brook, M.R.C.V.S., of Meadowside, Silverdale, Nr. Carnforth, Lancs., and Jeanne Mary Biggers, B.Sc., M.R.C.V.S., of Eynsham, High Street, Cranford, Middlesex.

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Birth.—Squire-Stevens.—On December 3rd, 1948, to Hermine, wife of W. A. Squire-Stevens, M.R.C.V.S.—a daughter, Angela.

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R.C.V.S. OBITUARY

Barton, Frank Townsend, 14, Kestrel Avenue, London, S.E.24. Graduated July 24th, 1896, Glasgow. Died December 3rd, 1948; aged 83 years.

Bone, H., Major R.A.V.C. (retd.). Graduated London, December 21st, 1906. Died at Gullane, East Lothian, December 5th, 1948.

Chapman, Frederick Arthur, Captain late R.A.V.C., Colonial Veterinary Service, Uganda. Graduated Liverpool, July 16th, 1943. Died May 2nd, 1948; aged 27 years. (Confirmation just received.)

Connolly, Thomas Aloysius, Captain late R.A.V.C., Wilmington, Delaware, U.S.A. Graduated Dublin, July 12th, 1916. Died August 22nd, 1945. (Confirmation just received.)

O'Mara, William Joseph Henry, 18, Edward Street, Downpatrick, Co. Down. Graduated Glasgow, July 18th, 1924. Died October 12th, 1948, aged 68 years, after a long illness.

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RESEARCH IN EAST AFRICA

The administration of research in East Africa, says *Commonwealth Survey* in its October issue, has been put on a new footing by the inauguration on January 1st, 1948, of the formal Inter-Territorial Organisation for Kenya, Uganda and Tanganyika. Among the scheduled services which come under the executive jurisdiction of the High Commission are the East African Research Services, which, in the final White Paper on Inter-Territorial Organisation in East Africa (*Colonial* No. 210) are listed under the headings of agriculture, cinchona, fishery, industrial, insecticide, medical, tsetse and trypanosomiasis, and veterinary. The Scientific Secretary to the East Africa High Commission, Dr. E. B. Worthington, acts as Director of Research.

The recently published report, *Colonial Research*, 1947-48 (Cmd. 7493) shows that in the financial year ending March 31st, 1948, research grants totalling £909,568 under the Colonial Development and Welfare Acts were allocated to the East African territories.

The economy of the East African territories being primarily agricultural, it is in the spheres of agriculture, forestry and veterinary science that the largest grants are allocated. Research in these subjects comes within the scope of the Committee for Colonial Agricultural, Animal Health and Forestry Research. This committee published, in June, 1948, its recommendations for the organisation of research in these fields, stressing particularly the importance of regional arrangements [see *Science and Research* (1948.) 3. July 10th].

The whole range of agricultural research in East Africa has been under review in recent years, and at a conference at Nairobi in 1946 it was decided that a new research station in Kenya should replace, as headquarters of the organisation, the Research Institute at Amani in Tanganyika. For this purpose land was bought at Limuru in Kenya with the assistance of a grant of £40,000 in the year 1945-46, and in the following year a further sum of £20,000 was granted, covering a period of five years, for the appointment of a Director of Agricultural Research who was to prepare detailed plans for the future organisation. Dr. B. A. Keen, who was for many years Assistant Director of the Rothamsted experimental station, was appointed to this important post.

In the field of veterinary research a grant of £119,000, of which £25,000 is for capital expenditure, has been made for the establishment of the East African Veterinary Research Organisation. The new organisation is to take over the Kenya Veterinary Research Establishment at Kabete near Nairobi and so will be close enough to the Agriculture and Forestry Research Station to work closely with it.

Tsetse and Trypanosomiasis

Research into trypanosomiasis of men and cattle, which is a great obstacle to social and economic progress in tropical Africa, is of medical and veterinary concern, but much of the research work comes under the Colonial Insecticides Committee. Tsetse research is carried out at Shinyanga in Tanganyika, while human trypanosomiasis is studied at Tinde. An East African Tsetse Reclamation Department, which is a separate centralised service under the High Commission, has its headquarters in Nairobi and gives advice and assistance in all schemes of practical tsetse reclamation.

Insecticide research is undertaken in East Africa by the Colonial Insecticides Research Unit in Uganda, which has carried out numerous experiments in the clearing of tsetse fly by means of screens sprayed with insecticide solutions and placed in the bush; though the fly cannot be eradicated by these methods, it has been proved that such screens are a useful protection at such places as river crossings where men and cattle tend to congregate.

Other experiments were concerned with the use of insecticides smokes and fogs, the spraying of the interior of native huts against mosquitoes, and laboratory trials of DDT. Experiments in the use of aircraft for spraying insecticides are planned for this year.

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NORTHERN IRELAND AGRICULTURE BILL

Details of the Agriculture Bill, which was formally presented to the Northern Ireland Parliament on November 16th, are now available. An explanatory Memorandum states that Part I of the Bill deals with the reorganisation of County Committees of Agriculture and with measures designed to assist the agricultural industry towards increased output.

It provides for the dissolution of the existing County Committees of Agriculture, as from a date to be determined, and for their replacement by County Committees containing representatives of the county council, farmers and agricultural workers of each county, and also independent members appointed by the Minister. These new Committees will have power to make recommendations to the Ministry on the development, improvement or expansion of agricultural services, and generally on the operation of the Act in their own areas. In addition they will take over the functions of the existing County Committees relating, *inter alia*, to the livestock premium schemes, lectures and classes, and the allocation of grants to show societies. Provision is also made for the appointment of specialist committees to advise the Ministry on agricultural matters such as the improvement of livestock, agricultural education, etc.

Education and Research

In Clause 5 opportunity is taken to consolidate in one enactment the Ministry's powers in regard to agricultural education and research. The Ministry may exercise these powers by providing schools, classes or research facilities, or by offering scholarships or by giving financial assistance to other bodies engaged in research.

Clause 6 places the land improvement scheme upon a permanent basis and empowers the Ministry to give financial assistance to farmers under schemes to improve the productivity or economic efficiency of their farms. Statutory authority is also being sought for the provision by the Ministry of various goods, services (includ-

ing advisory services) and schemes for the benefit of the farming community. In this connection may be instanced schemes for the improvement of the breeding of livestock, the eradication of diseases of animals and poultry, the propagation of new species or varieties of plants and crops, and the provision of land drainage and reclamation services.

Better Farming

Part 2 of the Bill aims at securing that agricultural land is maintained in good condition and is farmed in accordance with the rules of good husbandry. Provision is made for the service of a "classification notice" on an occupier whose land is unsatisfactorily farmed, an opportunity having been previously afforded to all interested persons to make representations to the Ministry against the service of the notice. Where a "classification notice" is served the occupier and any person interested in the land may appeal within one month to an Agricultural Land Tribunal, consisting of a County Court Judge as chairman, assisted by two assessors experienced in agriculture. It is proposed that a "classification notice" shall remain in force for a period of five years, but be subject to review at the end of every 12 months.

Where a "classification notice" is in force it is provided that the Ministry may serve directions on the occupier in order to secure that the land is maintained in good condition and properly farmed. Persons failing to comply with such directions would be liable, on summary conviction, to a fine not exceeding £100. Where a direction is not complied with the Ministry may arrange for the work to be carried out and the cost charged to the person to whom the direction relates.

Part 3 makes provision for the expenditure incurred by the Ministry in carrying the Act into effect, and also for the expenses of County Committees of Agriculture, Agricultural Advisory Committees and Agricultural Land Tribunals and for contributions payable by county councils for agricultural puposes.

Part 4 safeguards the superannuation rights of officers to be transferred to the Ministry from the existing County Committees of Agriculture.

Breeding of Livestock

In Part 5 of the Bill, Clause 39 deals with the amendment of the Livestock Breeding Act (Northern Ireland), 1922. The proposed changes broadly follow the recommendations of the Babington Committee, and include power to issue different forms of licence for dairy and beef bulls. Regulations to be made under the amended Act would be a subject for discussion with the Livestock Advisory Committee which it is intended to set up under Part I of the Bill.

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SALMONELLA IN THE DOG

Of 100 cases of distemper in dogs that were investigated recently, 18 were found to harbour salmonella organisms.—J. H. Steele, D.V.M., M.P.H., Chief, Veterinary Public Health Division, Atlanta, U.S.A.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible

DEHORNING BY MEANS OF RUBBER BANDS

Sir,—With reference to Mr. Cockburn's letter of December 4th, it would seem that dehorning by this method might render the person responsible liable to prosecution under either the Cruelty to Animals Act or the Animal Anaesthetics Act, or both.

It might be contended that unnecessary suffering was caused to the cow: directly by the pressure of the rubber band, and indirectly by any resulting suppuration. Secondly, it might be argued that, even if a local anaesthetic were to be used after January 1st, 1949,* before applying the rubber band, anaesthesia would not be maintained throughout the "operation"—in this case a process lasting three to eight weeks; and, therefore, that this practice would constitute a breach of the second Act referred to above.

The officers of the Association are seeking official guidance on these points.

Yours faithfully,
G. P. West.
Liaison Secretary, N.V.M.A.

* When the Amending Order permitting dehorning to be carried out under a local anaesthetic comes into force.)

TUBERCULOSIS FOLLOWING UDDER INFUSION

Sir,—I write in a private capacity.

As I was the person who was responsible for the application of treatment by udder infusion of cows among which cases of primary tuberculosis of the udder subsequently developed (*Vet. Rec.* **58**. 335), I was particularly interested to read the article contributed by the veterinary staff of the Ministry of Agriculture and Fisheries. (*Vet. Rec.* **60**. 377.)

The penultimate paragraph of this article is as follows: "In this connection udder treatment should be simplified by the use of the 'tube' preparations. *It is already clear that by leaving tubes for attendants to use there is danger of conveying other infections as well as tuberculosis.*" (My italics.)

It would appear to me important that, if information be available to justify it, a clear statement should be made indicating whether or not any cases of primary tuberculosis of the udder in attested herds have followed infusion using tubes only, *i.e.*, under circumstances in which there occurred no instrument contact between an infected cow and healthy ones.

Yours faithfully,
A. Brownlee.
Compton, Berkshire.
December 4th, 1948.

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CONDITIONS OF EMPLOYMENT OF YOUNG GRADUATES

Sir,—Veterinary students must, by now, be aware of the careful consideration which the N.V.M.A. has given to the request of the Association of Veterinary Students for a declaration of policy concerning the conditions of employment for young graduates in practice. Students with reasonable views, especially those experienced and conversant with current conditions, must be in full accord with the outcome of this consideration.

If it is accepted that the annual income of a non-business minded veterinarian prior to 1941 was in the region of £1,000, it is little wonder that professional employees' wages were not in keeping with their responsibilities and professional status. Since then, the agricultural practice has expanded, due to the survey scheme for farmers (1941) and to the farming community assessing the increasing value of its stock. Thus, when aided and coerced by the call for greater production, the farmers realised and acknowledged the value of the veterinary surgeon's services. The present level of salaries, though partly caused by the small number of available veterinary surgeons during the war, should continue, this being commensurate with proven ability, national prosperity and professional position.

It is appreciated, even amongst students, that in the past the new graduates may not have reached the expectations of the experienced practitioner. But, for three or four years, the majority of newly qualified veterinary surgeons will be experienced men with responsibilities, and aware of the relationship to employers concerning ethics of conduct, duty and loyalty. Regarding practical ability it must be emphasised that, with the facilities now being made available at the Field Stations of the Colleges, the student has experienced the practising of veterinary surgery and medicine.

The supply and demand of veterinary surgeons in all facets of the profession will be controlled by the new Council of the Royal College of Veterinary Surgeons and the N.V.M.A., though this can only remove an evident cause of a tendency for a fall in salaries. Veterinarians can appreciate that our professional way of life can only be more firmly strengthened and established by the younger members of the profession, their academic kn wledge blending with long experience and traditional customs.

Suffice it to mention that the profession could, with mutual allegiance and in its own way, give new vitality to the community —and assist in overpowering the malaise which implies that material wealth is the criterion of our daily supplications, in order that faith, the feeling of brotherly love and a sense of duty can be made known in reality.

Yours faithfully,
J. H. M. Cole Powney.
Veterinary Field Station,
Leahurst, Neston, Cheshire.
November 23rd, 1948.

Advertisers' Announcements

Christmas Holiday Arrangements

Bayer Products, Ltd., wish to advise their veterinary clients that their offices at Africa House, Kingsway, will be closed on Wednesday afternoon, December 22nd. They will also be closed from 2 p.m. on Friday, 24th, and on Boxing Day, Monday, December 27th. Urgent supplies required when the Bayer offices are shut can be obtained from Messrs. John Bell and Croyden, Ltd., 50, Wigmore Street, London, W.1.

Burroughs Wellcome & Co. announce that their offices at 183-193, Euston Road, N.W.1 (Euston 4477) will be closed from 4 p.m. on December 24th until 9 a.m. on December 29th. An emergency staff will be on duty from 9 a.m. to 12.30 p.m. on December 28th to deal with urgent orders.